

III. REMARKS

In the Office Action, objection was made to Claim 24 because of an informality as set forth in the Office Action. Claim 24 has been amended to correct the informality. Claims 1, 4, 6, 8, 9, 11-13, 20, and 24-27 were rejected under 35 U.S.C. 103 as being unpatentable over Brown (US 5,157,463) in view of Herbert (US 5,352,329), claims 2, 3, 5, 21 and 22 were rejected under 35 U.S.C. 103 as was claim 1 and further in view of Roy (US 6,118,540), Claims 7, 15 and 16 were rejected under 35 U.S.C. 103 as was claim 1 and further in view of Maeda (US 5,153,444), Claim 10 was rejected under 35 U.S.C. 103 as was claim 8 and further in view of Langley (US Pat. Pub. 2001/0012392), claim 14 was rejected under 35 U.S.C. 103 as was claim 11 and further in view of Lindow (US 4,748,335), Claim 17 was rejected under 35 U.S.C. 103 as was claim 11 and further in view of Nakagawa (US 4,148,065), and claims 18, 19 and 23 were rejected under 35 U.S.C. 103 as was claim 11 and further in view of Kanno (US 6,069,971) for reasons set forth in the Action.

The foregoing art was cited also in the previous Office Action for rejection of the claims.

With respect to the foregoing rejections under 35 U.S.C. 103 based on the cited art, it is noted that the basic ground of rejection is the combination of the teachings of Brown with Herbert. The examiner relies solely on these two references for many of the claims and, for claims reciting further limitations not taught by these two references, the examiner combines teachings from these two references with teachings from additional references, as set forth above.

As was noted in the previous response, there is no suggestion in either of these two references that the remnants of a partially removed bead of coating on a substrate resembles voids in a coating of solder on a component lead. In fact, there is a strong suggestion in Brown against a combination of these two references. Brown (column 3 at line 63) requires the outputting of statistical data to describe the defect in the solder coating. While Herbert discusses the construction of an electrostatic coating and the removal of a bead of such coating, he provides no teachings of a technique for observing and evaluating the removal of the bead of coating.

With respect to the combination of the teachings of Brown and Herbert, the examiner states in Point 4 of the present Office Action that Brown teaches a system and method providing basic elements of the present invention, including an illumination source, a camera providing a band of captured illumination with gray level picture data of the darker and the lighter pixels, as well as a controller for determining a ratio of a number of distinguishable pixels counted against a total number of pixels in the band. The examiner then observes that Brown does not disclose inspecting OPC devices for bottom edge wipe defects, and relies on Herbert to teach inspection of OPC devices for bottom edge wipe defects. The examiner then concludes that it would be obvious to combine the teachings of Brown with the teachings of Herbert so as to practice the present invention.

It is emphasized that the present claims specifically relate to an OPC device, as is evidenced by claim language reciting (in claim 1) "optically classifying residues on at least one bottom edge area of an organic photo conductor (OPC) device". The

coating on the OPC device and a bottom edge wipe defect, such as a bead of the coating, is also disclosed in claim language reciting (in claim 26) "optically classifying residues on a bottom edge wipe (BEW) region of an organic photo conductor (OPC) device".

The position of the examiner is traversed respectfully in view of the following argument.

As was noted in the previous response, the situation dealt with by Brown, and the teachings of Brown for dealing with his situation, differ from the situation dealt with by the present invention and the teachings of the present invention. Brown is concerned with the observation of solder placed on a component lead, and does not deal with the observation of bottom edge wipe for an OPC device. Herbert discloses an application of an OPC coating to a substrate of an electrostatographic imaging member, as well as the removal of a bead of the coating from the imaging member by use of acetic acid.

The formation of the bead is disclosed in Herbert in col. 1 at lines 32-43. It is interesting to note that Herbert does not disclose how one might observe a bead of the coating, whether there is too much coating or the coating is in the wrong place (Herbert, col. 1 at lines 20-23). Therefore, it must be presumed that a worker in this field would observe the coating and any bead by use of his eyes. Clearly, in Herbert, there is no suggestion of some sort of visual aid, such as computer aided vision (in which a computer performs an analysis of an image obtained by a camera) to alert the worker to a defective part of the OPC device requiring further work, such as an edge wipe procedure.

Since Herbert does not give any suggestions or guidelines for a computer-aided vision process, and certainly does not show a computer-aided vision process adapted for analysis of coatings and beads on the coating, the combination of the Herbert teaching with the Brown teaching on computer-aided vision (Brown col. 2 at line 50 to col. 4 at line 6) adds no useful information to the Brown teaching with respect to inspection of an OPC device. Therefore, there is no motivation to combine these two references, as the examiner has done in an attempt to show that the present claims are obvious over the cited art.

To emphasize this point further, it is noted that there are numerous techniques available for the analysis of images, whether the images be obtained by use of sonic radiation or electromagnetic radiation. The following techniques are believed to be available for images wherein the individual pixels are represented by digital samples, these techniques being presented by way of example:

1. Characterizing pixels on a basis of signal amplitude and/or color;
2. Statistically sampling signals falling within various categories of amplitude and/or color;
3. Comparing an image or portions thereof with reference patterns to identify the image or its portions in terms of similarity to the reference patterns;
4. Performing spatial measurements on image portions identified in foregoing process #3;
5. Performing a spatial Fourier transform followed by filtering on an image or selected image portions to identify characteristics of the subject of the image;
6. Measuring distances between clusters of pixels having a common characteristic;
7. Measuring sizes of clusters of pixels having a common characteristic; and
8. Comparing spectral

characteristics of an image or portion thereof to reference spectral patterns to identify characteristics of the subject of the image. Applicant's attorney does not have evidence of all of the foregoing techniques, but has the belief that such techniques are generally known.

For purposes of argument, let it be assumed that such techniques and combinations of the techniques are known and have been used for extraction of information from images. The utility of any one technique depends on the nature of the subject matter being imaged, and can be determined only by experimentation. The fact that a specific technique may have been used in one situation (for example, the observation of the color of a pie in an oven to determine if the pie is edible) does not mean that the technique would be useful in a different situation such as determining whether drippings from the pie are falling on the floor of the oven. In the latter case, a technique of pattern recognition might be required to determine if an image of the oven floor shows signs of drippings.

The foregoing example is provided to demonstrate that knowledge of a technique of measurement and/or analysis for one type of subject does not mean that the technique is useful for a second type of subject unless the nature of the subject matter requires such a technique, and preferably, experimentation has been conducted to determine that the technique is successful. The success of a technique for analysis of one type of subject by examination of the subject's image does not suggest that the technique can be employed successfully for analysis of a second type of subject until a detailed study and preferably experimentation is conducted with the second type of subject.

However, in the present rejection of the claims, the examiner has done the reverse. The examiner has taken a technique for measurement and analysis, which technique was said to be useful for the assessment of defects in a soldering process, such as the soldering of leads of electrical components (Brown in col. 1 at lines 25-28), and has alleged that that technique would be useful in the assessment of a coating on an OPC device to determine if an edge wipe is necessary to remove a bead of the coating.

Nothing in the art cited by the examiner substantiates the examiner's belief. No art cited by the examiner discusses a photographing of an OPC device followed by analysis of the resulting image as a way of gaining knowledge about the adequacy of the coating. Herbert discusses the prior art to identify various ways of handling photoconductive coating layers, and the present specification discusses the prior art with respect to a failure to provide automated visual inspection systems for bottom edge wipe defects.

The combination of Brown and Herbert was employed by the examiner in the rejection of independent claims 1, 11, 20, 24 and 26, and various ones of their dependent claims. For rejection of the independent claim 16, the examiner combines Brown with Herbert with Maeda, wherein Maeda deals with the subject of a defect in a circuit pattern.

Maeda describes the prior art employing a microscope with image analysis accomplished by comparison of two gray images of adjacent chips (col. 1 at lines 30-49), such a pattern-matching process forming a part of the Maeda system (col. 6 at lines 22-35). The examiner relies on Maeda to show prior knowledge of a

counting of pixels Point 13 of the Office Action). The examiner cites col. 11 at lines 34-37, but the preceding and the following lines indicate that the counting is related to alignment of images so as to be able to detect defects. The Maeda disclosure, which deals with geometric considerations of conductors and other components in an electric circuit, provides a very different appearance of subject matter as compared to an OPC device having a coating with a bead of excess coating. The Maeda disclosure simply serves as evidence of pixel counting as a possible step in image analysis. The Maeda disclosure provides no information as to how one should process an image of a bottom edge-wipe defect in a coating on an OPC device, and therefore there is no motivation to combine Maeda with Brown and with Herbert.

For rejection of the independent claim 23, the examiner combines Brown with Herbert and with Kanno, wherein Kanno deals with the subject of a pattern comparison inspection system. The technology of Kanno is not mentioned in the description of the inventions of Brown and Herbert, and appears to have no relationship to the Brown and Herbert disclosures, so that there is no motivation to combine these references. However, it is noted that the examiner employs Kanno only to demonstrate levels of acceptable classification (page 8 of the Action). Possibly the examiner believes that the Kanno teaching (Kanno in col. 9 at lines 3-23) of setting references for differences in pixel values applies generally to digital signal processing. Still it is urged that there must be some indication in Kanno, or in the combination of Kanno with Brown and Herbert, that show that the nature of the present subject matter (the OPC device with coating) can be described in terms of the cited passage of Kanno. There is no such indication in the cited art, as has been

noted above, so that there can be no motivation to combine these references.

Further analysis of these points appears in the previous response.

With respect to the teachings of other ones of the references that have been combined with Brown and Herbert, Roy teaches the use of an optical system to be employed with a computer for examination of circuit packages (Abstract), but there is no teaching of examination of beads on the OPC coating dealt with by the present invention. Langley teaches apparatus for illuminating and observing semiconductor wafers (Abstract) with processing of a received image, but there is no teaching of examination of beads on the OPC coating dealt with by the present invention. Lindow teaches the transport and optical viewing of semiconductor wafers, and plots reflectivity (col. 9 at lines 57-60), but there is no teaching of examination of beads on the OPC coating dealt with by the present invention. Nakagawa teaches the optical viewing of masks with photodiode arrays (col. 5 at lines 25-37) and observing different levels of video signals (col. 5 at lines 60-62), but there is no teaching of examination of beads on the OPC coating dealt with by the present invention.

Accordingly, it appears that the examiner has provided evidence of the existence of various techniques of measurement and analysis used in imaging devices, but has provided no teaching stating what type of technique(s) would be useful to analyze an OPC coating to determine whether it is necessary to implement a bottom edge wipe for proper manufacture of an OPC device. Particularly with respect to the present method claims, the

existence of known devices and techniques gives no indication as to how a novel method is to be performed, even if one or more of the known techniques is to be employed in the method. The present invention deals with a situation in which a coating is applied to an element used in photo-optical equipment, wherein there may be dripping of the coating. This is a different situation from any of those presented by the examiner and, therefore, there is no teaching in the art presented by the examiner which suggests how one is to analyze the coating.

It is believed that the examiner has simply decided, without evidence substantiating his decision, that the present method employs techniques found in the prior art and that, therefore, the present method, or possibly any method, employing such techniques is obvious. This position of the examiner is traversed respectfully for the reasons set forth above and, more particularly, because different types of physical objects (such as a semiconductor wafer package, or a photo-lithographic electric circuit, or a coating on an optical element) may require different techniques of optical analysis, depending on the nature of the information to be obtained.

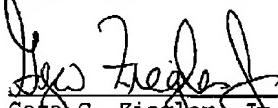
The present claims, as noted above, specifically recite the subject matter of the OPC device, along with a residue and bottom edge-wipe defect, to which the methodology of the invention is directed. It is urged that, before a reference disclosing a particular technique of analysis is applied to reject a claim, it is necessary to have a suggestion in that reference, or a suggestion in a further reference, that such a technique would be advantageous for extraction of the type of the desired information from an image of the object to which the claims are directed.

It is believed that the foregoing argument has overcome the rejections under 35 U.S.C. 103 raised in the present Office Action, and that patentable subject matter is present in the claims.

For all of the foregoing reasons, it is respectfully submitted that all of the claims now present in the application are clearly novel and patentable over the prior art of record, and are in proper form for allowance. Accordingly, favorable reconsideration and allowance is respectfully requested. Should any unresolved issues remain, the Examiner is invited to call Applicants' attorney at the telephone number indicated below.

The Commissioner is hereby authorized to charge payment for any fees associated with this communication or credit any over payment to Deposit Account No. 24-0037.

Respectfully submitted,



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